# Abdominal band-variations in *Eristalis tenax* (Linnaeus)

(Diptera : Syrphidae)

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In the California Insect Survey Collection of Syrphidae, University of California, Berkeley, are fifteen peculiar specimens of *Eristalis tenax* (Linn.) showing extreme variations in the abdominal markings. It is rather strange that in hundreds of specimens examined in the collection only fifteen were found to show marked variations from the normal pattern, though extremely minute variations were a common feature in the huge collection. Cockayne (1929) and Smith (1955) have described abdominal variations in Diptera and in the genus *Chrysotoxum* (Syrphidae), respectively. Williston (1886), Verrall (1901), Brunetti (1923), and Sack (1932) differ a good deal in their description of the abdominal markings in this species, so for the sake of clarity in regard to the normal pattern, the following brief description may well serve the purpose.

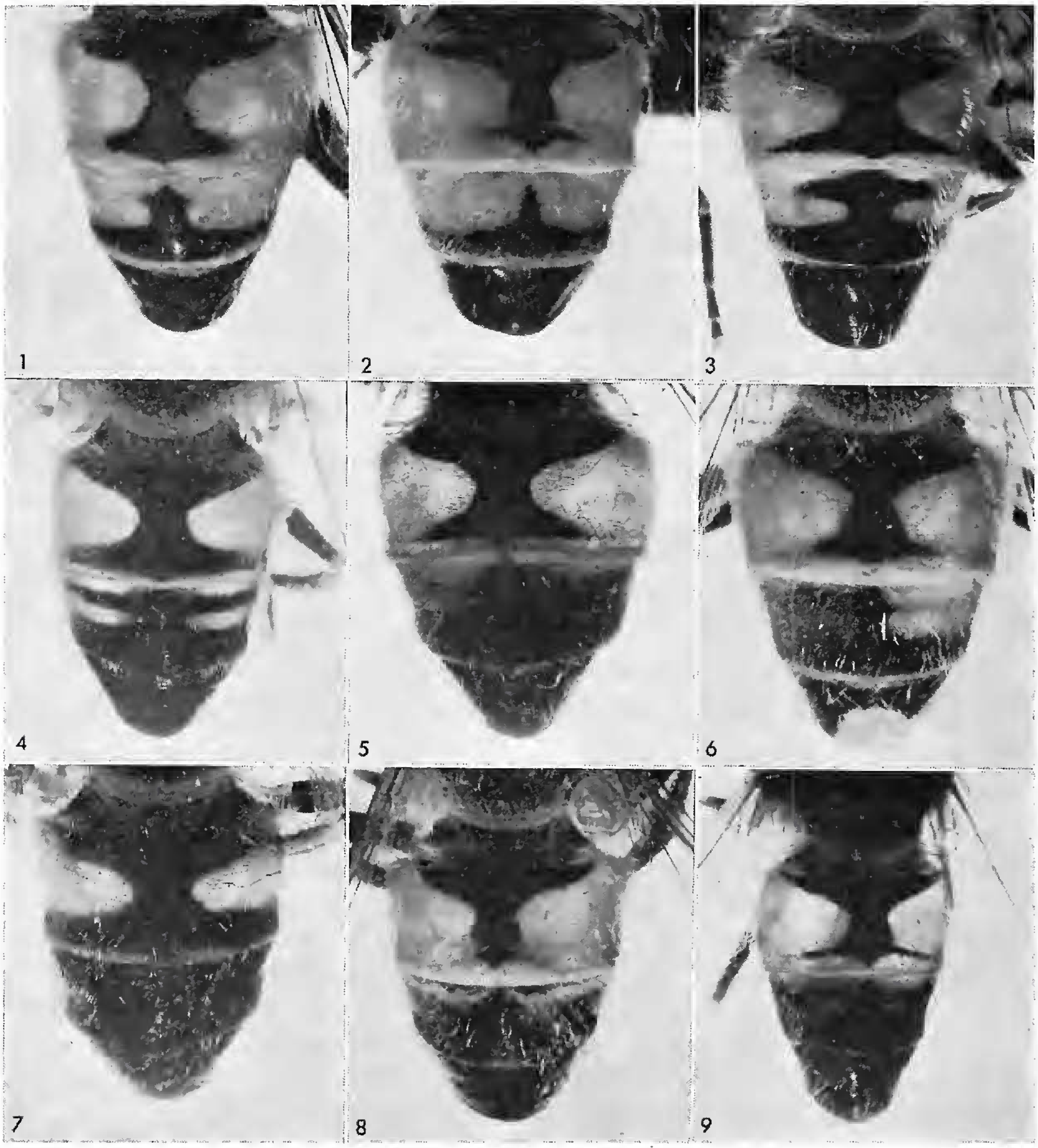
Male abdomen.—(Fig. 1) first tergite black, somewhat long shining, grayish pile over dorsum except lateral borders; second and third mainly brownish yellow; basal black band on second tergite narrows towards sides, almost reaching extreme ends of segment, median black band with inner margins brownish, narrow in middle with diverging arms at basal and distal ends, joins basal band basally and hinder black band distally leaving extreme margin yellowish, hinder band runs only about one-third of segmental width, extreme margin of segment pale; basal band on 3rd segment extremely reduced, median black band of almost uniform width joins hinder broader, black band narrowing laterally, anterior, lateral and posterior borders yellowish; rest of abdomen black; pile yellow.

Female abdomen.—(Fig. 10) first segment dull black with extreme lateral borders yellowish, long grayish pile from hinder border extends over basal band of 2nd segment; second segment more yellowish than third, hinder black band extends more than two-thirds its width, rest like that of male; basal band on 3rd segment not reaching extreme side margins, median band approximately four times thicker than long and hinder black band extremely thick, anterior border and narrow, lateral, linear areas yellow; rest of abdomen black; pubescence yellow.

The fifteen specimens of *Eristalis tenax* (Linn.) showing marked variations from the above normal pattern are described below.

(i). *Male*, Berkeley, California, 26 January 1923, A. J. Basinger (Fig. 2). Lateral borders of median black band on 2nd segment diverging basally and converging distally, hinder band extremely small with minute, posterior, median knob-like projection. Basal band on 3rd segment absent and width of median band narrower than normal.

(ii). *Male*, Ontario, California, 29 June 1950, J. D. Paschke (Fig. 3). Lateral borders of median black band on 2nd segment equally diverging at both ends,



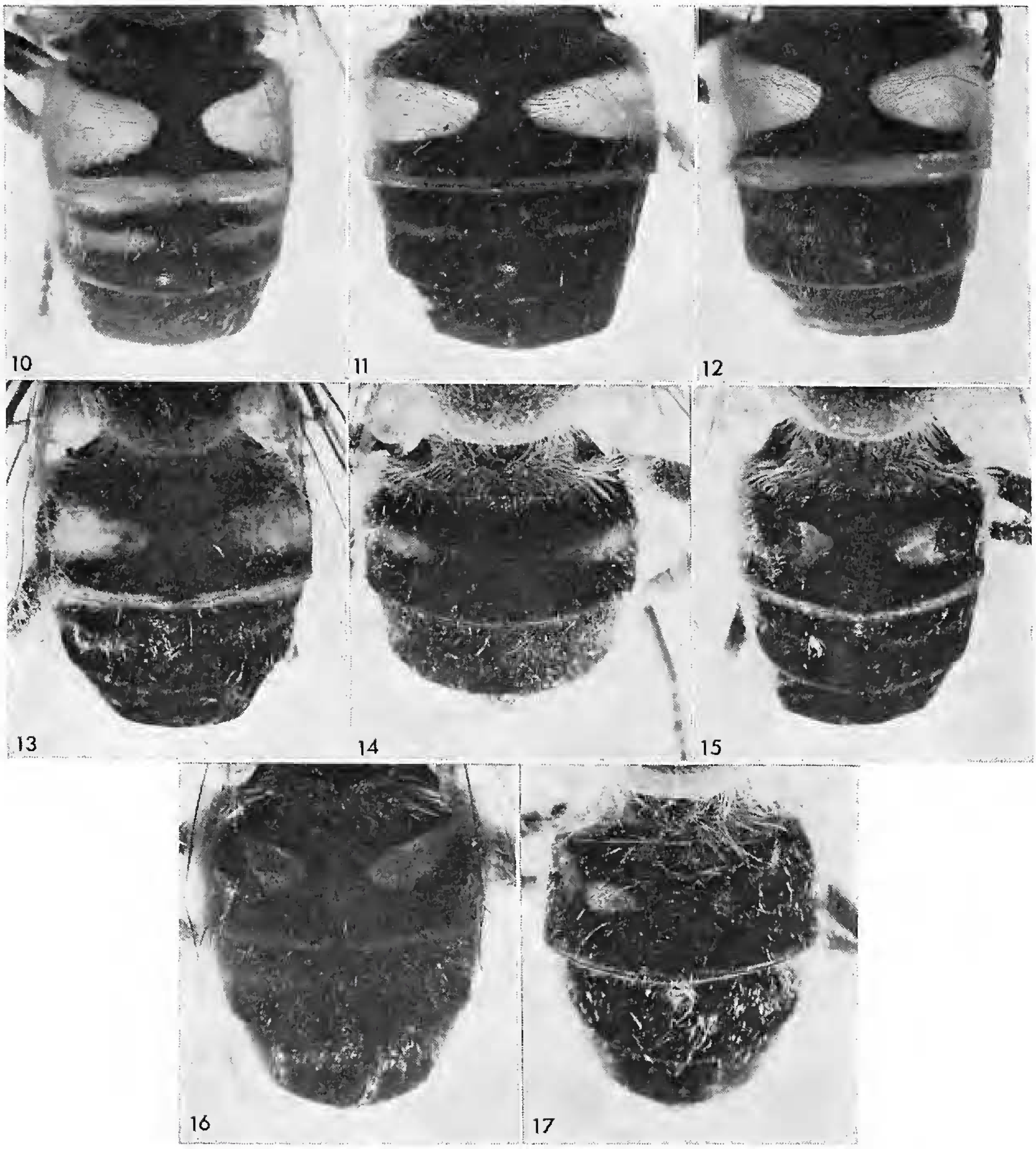
FIGS. 1–9. *Eristalis tenax* (Linn.), male abdomens. (See text.)

hinder band running more than half of segmental width, leaving extreme margins pale. Prominent basal band on 3rd segment extending up to about half the width of segment.

(iii). *Male,* Alum Rock Pk., Santa Clara Co., California, 25 May 1950, E. G. Linsley (Fig. 4). Distinct lobe-like yellow lateral spots on 2nd segment. Hinder band on 2nd segment nearly runs the width of segment, leaving extreme margins yellow. Basal band on 3rd segment almost complete, median band extremely short. Pair of lateral, narrow, linear, yellow spots a little above middle of segment.

(iv). *Male,* Viola, Shasta Co., California, 19 May 1941, E. G. Linsley (Fig. 5). Hinder band on second segment running about half the width of segment leaving sides yellow. Third segment with rectangular extension of yellow spot on left hand side.

(v). *Male,* Tanbark Flat, Los Angeles Co., California, 21 May 1950, M. J. Stebbins (Fig. 6). Hinder band on 2nd segment very faintly marked, about half



Figs. 10–17. *Eristalis tenax* (Linn.), female abdomens. (See text.)

the width of segment. Left half of 3rd segment black, but a distinct yellow spot on right side, which runs about two-thirds its length from anterior to posterior border.

(vi). *Male,* Hood River, Ore., 20 June 1917, F. R. Cole (Fig. 7). Median band on 2nd segment rather short and thick, while hinder band running distinctly along entire length of segment. Lateral yellow spots narrow with blackish hue. Third segment entirely black.

(vii). *Male,* Lakeside, San Diego Co., California, 18 April 1953, Wild Mustard, J. Powell (Fig. 8). Median band on 2nd segment somewhat swollen medially and ending in knob-like projection posteriorly, hinder band entirely lacking. Third segment black except for yellowish extreme anterior margin.

(viii). *Male,* Ontario, California, 1 June 1950, J. D. Paschke (Fig. 9). Hinder black band on 2nd segment prominently marked about half the width of segment, becoming indistinct laterally. Somewhat less marked basal black band runs medially on 3rd segment. Anterior margin pale with pair of small yellow spots on sides of median black stripe. Small triangular yellow mark present on anterior left hand side.

(ix). *Female,* Berkeley, California, 1 June 1940, Miller (Fig. 11). First segment entirely dull black. Hinder band on 2nd segment running entire width of segment; basal band on 3rd segment reaches extreme side margins. Lateral linear areas less distinctly marked.

(x). *Female,* Shingletown, Shasta Co., California, 2 June 1941, C. D. Michener (Fig. 12). First segment shining black; hinder band on 2nd segment entire; third segment black with extremely reduced mediolateral yellow spots.

(xi). *Female,* Hopland Field Station, Mendecino Co., California, 13 June 1955, M. Wasbauer (Fig. 13). Posterior border and lateral spots on 2nd segment distinctly brownish-yellow. Third segment with brownish, narrow, lateral stripes.

(xii). *Female,* Berkeley, California, 2 June 1952, J. J. Menn (Fig. 14). Basal band on 2nd segment extremely thick and complete, median band almost reduced in length. Lateral spots brownish, tapering towards extreme ends. Third segment black.

(xiii). *Female,* Antioch, Contra Costa Co., California, 19 October 1947, C. C. Danham (Fig. 15). Basal band on 2nd segment complete; yellow spot of irregular shape on right side somewhat bigger than one on left side. Somewhat indistinct, narrow, linear, lateral yellow markings present on 3rd segment.

(xiv). *Female,* Clear Creek, Iowa, 15 September 1957, J. R. Powers (Fig. 16). First and third segments entirely black. Pair of slantingly placed brownish yellow spots, with their extremely narrow cone-like upper ends, touching basally the anterolateral borders of 2nd segment. Right side spot rather more conical than one on left side. Extreme distal border of 2nd segment somewhat brownish-yellow.

(xv). *Female,* Berkeley, California, 31 March 1952, R. E. Wagner (Fig. 17). Abdomen almost entirely black. Extremely small triangular brownish spot on right side and fairly large yellow mark on left side of 2nd segment.

The present findings suggest in no small measure that the individuals of *Eristalis tenax* (Linn.) are especially prone to such abnormalities.

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# Observations on the Life Histories of Four Species of *Epeorus* in western Oregon

(Ephemeroptera : Heptageniidae)

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A lack of basic biological information is a serious impediment to the study of aquatic insect ecology. A large percentage of the immature stages of Ephemeroptera cannot be identified to species and the life histories of most have not been studied (Berner, 1959). Except for notes in taxonomic treatments (Edmunds and Allen, 1964; Jensen, 1966) the biologies of the northwestern species of *Epeorus* Eaton are unknown.

Four of the eight species of *Epeorus* reported to occur in Oregon (Allen and Edmunds, 1956) are found in Oak Creek, 5 miles northwest of Corvallis, Benton County: *Epeorus* (*Iron*) *longimanus* (Eaton), *E.* (*Ironodes*) *nitidus* (Eaton), *E.* (*Iron*) *albertae* (McDunnough), and *E.* (*Iron*) *deceptivus* (McDunnough). I have reared the nymphs of the first three to the adult stage in the laboratory, but adults of *E. deceptivus* have not been reared from the study area. The nymph of the fourth has been determined to species by referring to the keys and descriptions provided by Edmunds and Allen (1964), and by comparing the nymph with material in the Oregon State University collection which was identified tentatively as *E. deceptivus* by R. K. Allen.

Oak Creek is a small woodland stream located in the eastern foothills of the Coast Range at an elevation of approximately 400 feet. The stream flow ranges from a minimum of 0.1–0.2 cfs during the dry summer and fall to over 20 cfs during winter freshets. The width ranges from 2 to 8 feet and may reach 15 feet during severe floods. In the study area, the substrate consists of gravel with many scattered 4–6-inch

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